



# A systematic review of interventions to improve recall of medical advice in healthcare consultations

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## DECLARATIONS

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None declared

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PWBW carried out the searches. Both authors reviewed the retrieved papers and wrote the review

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## Abstract

**Background** In order for patients to adhere to healthcare advice, it is essential that they are able to recall this following a consultation. Although psychological research exists which highlights techniques and factors postulated to influence recall, only a limited body of work has been conducted to evaluate their effectiveness in a clinical context.

**Aim** To carry out a systematic review of intervention trials designed to enhance recall of medical information.

**Methods** We searched Medline (1950–April 2007); Embase (1980–April 2007); Cinahl (1982–April 2007); PsychINFO (1969–2007); and the Cochrane Library Collection. Secondary searches were made through reference to relevant journals and reference lists from relevant papers/review papers.

**Results** From 69 papers provisionally identified, 34 papers met the inclusion criteria. Nine recall interventions had been evaluated (audio recordings, written materials, adjunct questions, prompt sheets, visual aids, cognitive strategies, rehearsal, communication styles and personalized teaching). Despite the experimental and theoretical evidence which could have informed cognitive interventions to enhance recall of healthcare advice, most studies primarily focused on the use of written and/or audio-recorded medical instructions. Although the majority of studies supported these approaches insofar as they enhanced recall, the findings were equivocal.

**Conclusion** While written and tape-recorded instructions appear to improve recall in most situations, a dearth of interventions incorporating psychological theory was readily apparent. Further research is required in clinical settings to determine if cognitive interventions based on a more over-arching psychological model of recall are effective.

## Introduction

In order for patients to make decisions about medical treatments and to accurately carry out the recommendations of their doctor, nurse or other healthcare professional, they must understand the nature of their illness, treatment options, prog-

nosis and, if appropriate, a clear plan of what to do if a problem does not improve ('safety netting'). Moreover, they need to be able to recall this plan. A plethora of research has shown that recall of clinical information and treatment is frequently suboptimal.<sup>1–4</sup> It has been hypothesized that the ability to recall this information predicts patient

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satisfaction, and in turn, enhanced adherence to recommended treatment.<sup>5,6</sup>

Only a small proportion of information with which humans are presented is successfully encoded and retrievable.<sup>7,8</sup> However, recall has also been postulated to be format-dependent, for example words, numbers and symbols,<sup>9</sup> and can be selective.<sup>10</sup>

During medical interactions, patients have to understand and 'encode' several pieces of important information for each problem they present with. Therefore, a large amount of potentially new and possibly unfamiliar data has to be accurately stored for subsequent retrieval and action. Given the indirect, yet pivotal, role recall can play in health outcomes, strategies identified to enhance the successful recall of information in consultations should be carefully considered and harnessed by healthcare professionals. Several factors are known to influence recall ability and may suggest strategies to improve recall for groups of patients for whom such strategies are most likely to be needed.

## Factors postulated to influence recall ability

### Age, gender, and educational status

Older people are less able to recall information successfully.<sup>11</sup> Grady *et al.*<sup>12</sup> concluded that this may be due to deficits in data encoding processes. In relation to this, McGuire<sup>13</sup> suggests that recall in older individuals may be assisted by the repetition of information and the provision of written material. Research focusing on the influence of gender on recall ability has been somewhat limited. However, what material there is suggests women consistently performed to a higher standard.<sup>14</sup> Reading ability<sup>15</sup> and education level<sup>16</sup> are also positively associated with recall of medical information. All factors which should be taken into consideration when consulting.

### Emotional state during data encoding

Recall of information is significantly influenced by one's emotional state during the encoding and storage process.<sup>17</sup> In particular, high and low anxiety levels can impact negatively upon recall ability.<sup>18,19</sup>

## Volume of information and order of presentation

The amount of information presented impacts on recall.<sup>20,21</sup> Empirical tests have shown that if another mental task is performed immediately subsequent to the presentation of material to be remembered, less than 10% of data is successfully recalled after 15 seconds.<sup>22</sup> Additionally, information presented towards the beginning and end of a list is recalled more successfully than units presented in the middle of the list (the 'primacy' and 'recency' effect). This, clearly, may impact upon the amount of medical information remembered after a consultation, as many issues may be discussed. Dealing with the most important issues at the beginning and end of a consultation should enhance the likelihood of successful recall.

## Perceptions of importance and specificity of instruction presentation

The perceived level of importance or relevance attached to specific pieces of medical advice has been shown to influence recall in some observational studies,<sup>23,24</sup> but not in others.<sup>25</sup> Recall of advice was found to be better if it is conveyed in specific terms rather than in a generalized way (e.g. 'your finger will heal in 5–7 days' may be recalled to a greater extent than 'your finger will heal shortly').<sup>26</sup>

## Pre-existing health status schemas

There have been observational studies in alcohol management<sup>27</sup> and osteoarthritis<sup>28</sup> which demonstrate that recall performance is better for information that supports patients' own opinions. It has been suggested that one reason to account for the high rate of non-adherence with medical recommendations is that individuals hold 'selective memory biases in favour of information supporting the idea that one is healthy'.

## Mode and context of information presentation

Verbally communicating medical information with patients has the benefit of being quick, but written material should lead to greater recall. This method of communication may be particularly

helpful for patients receiving advice that may be anxiety provoking and for those who are hard of hearing. However, written material poses difficulties for patients with literacy problems<sup>18</sup> – a significant proportion of the population.<sup>29</sup>

Pictographs using 'drawing representing instructions' were presented to a sample of adults in a job training programme in order to assess their recall of the material over a relatively long period of time (4 weeks).<sup>30</sup> The results of this study suggested that the presentation of pictographs produced an impressive level of recall. Further, a review of other recall-related research suggests that 'pictures closely linked to written or spoken text can, when compared to text alone, markedly increase attention to and recall of health education information'.<sup>31</sup> Additionally, recall performance can be enhanced when material is delivered in an environment where it is to be recalled.<sup>32</sup>

Much of the research carried out on memory has not been conducted in a clinical setting, while many of those interventions that have been tested have used uncontrolled methodologies. We set out to systematically review existing research relating to interventions designed to enhance recall of medical information.

## Methods

### Criteria for considering studies for this review

Studies were included if they were randomized controlled trials, controlled trials or randomized trials (i.e. two or more comparative groups).

### Types of participants

All studies set in a clinical setting involving health-care professional–patient interactions.

### Types of interventions

Studies were included if they incorporated some form of specific preconceived intervention (e.g. written material, audio recordings, specific presentation styles, etc.) specifically designed to test its comparative effect on recall/knowledge of clinical instruction/consultation/counselling advice.

## Types of outcome measures

Studies were included if they specifically measured recall performance as an outcome variable.

## Search methods

The following electronic database searches were conducted (i.e. Medline (1950–April 2007); Embase (1980–April 2007); Cinahl (1982–April 2007); PsychINFO (1969–2007); and the Cochrane Library Collection). A trial filter equation was integrated into each search strategy except the Cochrane Library search where keyword searches were conducted. Secondary searches were made through reference to relevant journals and reference lists from relevant papers/review papers.

Details of each database search strategy are detailed in Appendix A. The table of results is detailed in Appendix B and details of the papers excluded ( $n=35$ ) from this review are listed in Appendix C. The appendices are available online at <http://jrsm.rsmjournals.com/cgi/content/full/102/6/235/DC1>.

## Meta-analysis

We intended to carry out meta-analysis if the data were sufficiently comparable.

## Results

The search strategies returned 627, 82, 313, 208 and 241 hits from Medline, Cinahl, Embase, PsychINFO and the Cochrane Library, respectively. From this return, 69 papers (excluding review papers), were provisionally selected. Two researchers examined this selection and, on the basis of the inclusion criteria, reduced the number of papers selected to 34.

### 'Practical' interventions to enhance recall of clinical information

The 34 studies that met inclusion criteria were conducted between 1979 and 2007. Sample sizes ranged from 30 to 318 patients, nine reported power calculation estimations, and the length of time between information presentation and recall was between 'immediate' recall and six months.

Nine intervention approaches were evaluated (i.e. audio recordings, written materials, adjunct questions, prompt sheets, visual aids, cognitive strategies, rehearsal, communication styles and personalized teaching). The majority of studies primarily focused on the use of written and/or audio-recorded medical instructions to enhance recall of clinical advice. Meta-analysis, however, was not appropriate due to the marked variability in interventions and settings.

### Audio-recordings

Ten papers specifically focused on providing patients with audio recordings to test the hypothesis that such an intervention would enhance recall of clinical information. Five papers<sup>33–37</sup> found that providing audio recordings post consultation positively impacted upon clinical information recall rates at a later date when compared with patients who did not receive a recording. Although all five studies recruited oncology patients to participate, the context of the consultation differed (e.g. some were initial oncology consultations where the diagnosis was delivered, while others were regular consultations), the delay between consultation and recall ranged between seven days and six months and the demographic make-up of the study samples were variable. Indeed, it is arguable that the studies were heterogeneous in many ways. This may partially explain why five other studies<sup>38–42</sup> did not find a positive relationship between having a tape recording of a consultation and an enhanced recall ability.

### Written materials

Three studies discussed above compared audio recordings to the use of written materials.<sup>38,40,41</sup> However, seven studies have specifically focused on the efficacy of providing written material post-consultation to aid recall.<sup>43–49</sup> While three<sup>43,45,49</sup> didn't report any positive effect of providing a written account of the consultation compared with controls, the remaining four studies<sup>44,46–48</sup> all reported that providing written materials to patients post consultation had had a significant, positive influence upon subsequent recall of clinical information/advice.

### Adjunct questions

Higgins and Ambrose<sup>50</sup> explored the efficacy of adjunct questions in written material. Adjunct questions refer to one or more questions posed after a piece of text designed to test one's understanding of the preceding text. Previous non-clinical research<sup>51,52</sup> has reported the value of adjunct questions in relation to information retention. The theoretical basis to account for this phenomenon is that individuals exposed to adjunct questioning will be more likely to review and thus retain what has been read. Therefore, in order to test this intervention, Higgins and Ambrose randomly allocated older adult patients to receive written material about postoperative eye treatment incorporating adjunct questions; written material with no adjunct questions; or to a control group who received no written material. Recall ability was measured through interviews and by means of a checklist. Those exposed to the written material outperformed the individuals allocated to the control group. However, no significant difference in recall ability was detected between those exposed to adjunct questions and those who were not.

### Prompt sheet

Another practical aid designed to enhance recall is a prompt sheet. The rationale behind providing a prompt sheet to patients attending consultations is to actively encourage question asking. Hypothetically, this process should subsequently enhance recall performance. However, contrary to this hypothesis, Butow *et al.*<sup>53</sup> found no difference between those who were furnished with a prompt sheet and those who were not. However, Brown *et al.*<sup>54</sup> found that in a group of patients randomized to receive the prompt sheet, recall was superior to controls when their oncologist systematically went through the issues listed on the prompt sheet with them. Therefore, it would appear that clinician involvement in the use of a prompt sheet aid is more likely to enhance patient recall.

### Visual aids

The efficacy of visual aids has also been tested with contrasting findings in trials.<sup>55–58</sup> Done and Lee<sup>55</sup> made use of a preoperative video to provide

patients with information before ambulatory surgery. They found that, in comparison to controls that did not have access to the video, patients were 2–16 times more likely to recall all knowledge questions (e.g. process, risk, misconceptions, etc.) correctly. Mansoor and Dowse<sup>56</sup> found that those receiving pictogram material about their medication had a significantly higher level of recall compared to those in the control group or written materials only group. Bakker *et al.*<sup>57</sup> allocated patients undergoing chemotherapy with one-to-one teaching sessions with a nurse in addition to a video supplement for half of the group. No significant differences were found between the groups in terms of recall. Both groups were reported as having a high level of information recall. This finding suggests that one-to-one ‘teaching sessions’ were the active ingredient of their intervention. Shurnas and Coughlin<sup>58</sup> found that patients presented with a text-based visual aid detailing surgery risks during an informed consent consultation did not recall significantly more risks 12 weeks post surgery than those who were not presented with the visual aid.

### Cognitive methods of improving recall

Four papers specifically explored methods of information delivery or confidence training.<sup>59,60,62,63</sup> Isaacman *et al.*<sup>59</sup> examined the efficacy of delivering standardized instructions to patients to enhance communication of discharge information to parents of children presenting with otitis media. Standardized instructions are defined as ‘decreasing the amount of medical jargon, simplifying the language used, and reinforcing essential information with review’. Parents were randomly allocated to receive: (1) instructions by house staff or medical students after a meeting with a physician; (2) standardized instructions by house staff or medical students trained in their use; and (3) condition two in addition to type written notes. Parents receiving standardized instructions had a significantly higher level of recall in terms of illness-related instructions/advice compared to the control group. The addition of written notes did not improve parental recall, suggesting the delivery of a simplified instruction protocol is an effective way to enhance recall.

McGuire *et al.*<sup>60</sup> investigated whether the use of ‘Elderspeak’, a style of communication commonly

used by health/social care providers when intimating instructions/advice to older patients. Elderspeak is typically characterized by a ‘slower rate of speech, short utterances, low complexity of speech with high pitch and varied intonation’, and although controversial, has been shown to improve older adults understanding.<sup>61</sup> Fostering this approach, McGuire *et al.* tested the use of this communication style in its ability to improve recall of medical instructions in an older adults presenting with osteoarthritis. Their results found that those who were randomly allocated to receive their advice in Elderspeak had a superior level of recall compared to a control group. Additional note-taking also improved recall among those who were exposed to Elderspeak advice.

Investigating whether other formats of information delivery could be effective was tested by Thickett and Newton.<sup>62</sup> They presented procedure-related information to 30 orthodontic patients prior to treatment in three different formats (i.e. written, mind maps and acronyms). Patients’ recall was tested short term (10–15 minutes post information delivery) and long term (six weeks post information delivery). Their results revealed that the use of mind maps and acronyms ‘convey a small but significant advantage in patient recall of information over written information leaflets’.

Lastly, Lewis *et al.*<sup>63</sup> tested the efficacy of a confidence/motivational video presented to children attending for a clinical consultation. The video highlighted the importance of effective communication between patients and doctors, and gave advice on how to put this into practice. Children in the intervention group (i.e. receiving the motivational video) remembered significantly more medication recommendations than those assigned to a control group (who received a generalized healthcare video to watch immediately prior to the consultation). Motivational training may be a worthy avenue to explore in future research.

### Rehearsal and repeated questioning

The practice of asking patients to repeat medical advice has been tested to measure its efficacy in enhancing recall. White *et al.*<sup>64</sup> studied a sample of 50 patients who underwent a percutaneous lung biopsy. Twenty-seven patients gave their consent

for the procedure to proceed after receiving a standard statement highlighting potential complications of the surgery. The other 23 patients received this briefing, but were additionally asked to recite the risks to the surgeon, until they were able to do this correctly. Patient recall of risk was evaluated four hours post consent. Their results revealed that those receiving the intervention performed significantly better ( $p=0.005$ ) in terms of recall than those receiving standard risk information.

Ornstein *et al.*<sup>65</sup> noted that 'a large body of evidence representing a variety of theoretical and methodological traditions indicates that additional presentations of aspects of a previous experience can serve to maintain memory over extended delay intervals ... to the extent that a verbal interview can be viewed as a reinstatement of an earlier experience, additional interviews would be expected to result in enhanced accuracy and decreased forgetting'. Basing an intervention on this premise, Ornstein measured recall of details of paediatric examinations among a group of 4-7-year-old participants. However, no effect of repeated questioning at three months was observed on performance at the six-month assessment.

### Communication style decision-making

In recent years, a great deal of empirical work has focused on the importance of doctor-patient communication style. In particular, research has focused on the potential difference between a shared (patient as equal partner) and a doctor-directed consultation style. While there is some evidence that a patient-centred approach to consultations can result in increased satisfaction, adherence and outcome, which has led this consulting style to be widely endorsed by educators and researchers,<sup>66</sup> the evidence is equivocal.<sup>67,68</sup> In recognition of this, Gattellari *et al.*<sup>69</sup> aimed to evaluate the impact of shared decision-making and the achievement of preferred role on patient anxiety, recall of information and satisfaction. Recall, however, was not significantly influenced by role.

### Personalised teaching/action plans

Cooil and Bithell<sup>70</sup> attempted to measure if personalized instruction enhanced the recall of medical information. Forty-two preoperative hip replace-

ment patients were randomly allocated to standardized written instructions only or standardized written instructions in addition to a personalized instruction and physical demonstration session. Recall of exercises and medical advice was measured on the first postoperative day. Their results found no significant difference between both groups in terms of recall performance on each of the five exercises taught preoperatively and in terms of medical advice measured by a multiple choice questionnaire.

Saunders *et al.*<sup>71</sup> executed a similar study in that they exposed a group of patients to either receive written material detailing seven 'core' health maintenance concerns or to attend a brief one to one session with a nurse to discuss and identify health risks and subsequently develop a 'plan for seeking any desired information about these risks'. The latter intervention had a significant positive impact upon patient recall in comparison to the written material information ( $p<0.05$ ).

Finally, Webber *et al.*<sup>72</sup> conducted a controlled trial where three groups of cardiomyopathy patients were given written material about their medical condition. One group, however, received a '5 Rs' teaching session. This comprised of written material containing adjunct questions and personalized feedback and re-teaching to strengthen the learning process. The second group received written material containing adjunct questions. The third group received written material only. The results of the trial showed recall was significantly better in the group receiving the 5 Rs programme compared with the adjunct questions group and the control group.

### Discussion

In summary, it would appear that high quality studies on interventions designed to enhance recall of information have primarily focused on furnishing patients with written or recorded material for reference post consultation. Although the majority of studies supported this approach, some findings were equivocal. Irrespective of some divergent findings (possibly due to heterogeneous methodological approaches), these techniques appear to have been useful in aiding patients and carers of patients to understand and recall clinical information needed for the maintenance of one's health status. What is readily apparent is the

**Box 1****Practical evidence-based methods for clinicians to enhance recall***Written materials*

- Developing written materials appears to be an efficacious way of aiding recall, however, the provision of such for all possible clinical presentations is problematical and a significant minority of most populations have literacy difficulties.<sup>29</sup> However, the use of pictograms may overcome this difficulty<sup>30</sup>

*Audio recordings*

- Audio recordings of consultations have been shown to be helpful for some individuals receiving potentially distressing news, although this approach may only be practical or appropriate in limited circumstances

*Approaches based on psychological theory*

- Use simple communication which defines diagnoses, prognoses and treatment advice in concrete and specific terms ('contact me again in five days' as opposed to 'a few days' and specifying exactly the terms, for example 'if the cough hasn't cleared' as opposed to 'if you're not better') with repetition of instruction and summarization<sup>26,59</sup>
- Ask patients to repeat advice<sup>64</sup>
- Building patients confidence in self-management aids recall<sup>63</sup>
- Personalize plans for patients as opposed to giving generic literature<sup>72</sup>
- The use of acronyms and mind maps as aide memoirs in special circumstances may be helpful although these may be difficult to routinely apply<sup>62</sup>
- Extra consideration should be given to the way in which information is presented when consulting older people, patients with relatively low literacy skills and anxious patients. Interestingly, many clinicians feel uneasy with the use of 'Elderspeak', but it does appear to be more effective at aiding recall than normal speech with elderly patients, probably because it is relayed simply and clearly and repeated<sup>60</sup>

dearth of high quality studies exploring interventions incorporating psychological theory. However, those studies that have been carried out do suggest that the several are effective. Box 1 provides practical advice to clinicians based on these studies.

No trials were identified that have explored the effect on recall in a clinical setting of restricting the amount of information given at any one time or on prioritizing important advice by placing it last in

discussions although there are good psychological reasons for believing these techniques may be effective. This is important as consultations particularly in primary care have become increasingly complex, often dealing with a medical agenda of long-term illness management as well as the patients' presenting complaints and it would be useful to know if such consultations would be better broken up to aid recall.

While there have been several intervention specific reviews in the area of recall,<sup>73-77</sup> this study provides a more over-arching and comparative review of the disparate approaches. However, just as in other reviews, the heterogeneity of the interventions precluded any meaningful synthesis of the data. We adopted a very broad and inclusive search strategy and identified many more papers than previous reviews, however, given the imprecision of the descriptors in this field it is possible some may have been missed.

### **The changing face of consultations and considerations for information recall**

There has been an increased use of telephone and more recently of email consulting in primary care.<sup>78</sup> Little is known about the influence on recall of these newer types of consulting although it would seem evident that e-consulting with a permanent record should improve recall. However, as telephone consulting is widely used in many general practices, it is imperative that the impact of this medium of communication on recall of important medical information is assessed.

### **Implications for clinicians or policy-makers and future research**

A variety of interventions including written and recorded material, mind-maps, acronyms and cognitive approaches (such as the use of clinician and patient repetition of instruction, summarization, giving advice in concrete and specific terms, and techniques to build confidence) could potentially influence how well people can remember the advice given to them by their healthcare professional.

Ideally, the experimental research underpinning theories for improving recall should be tested in clinical settings. However, for practical and ethical reasons, this may be difficult to execute. Effective and acceptable methodologies need to be

developed to enable this. Successful exploration of this area could allow for the development of a theoretically driven cognitive-educational intervention incorporating some of the techniques suggested above followed by trials to assess the efficacy of such interventions in traditional and new types of consultation. Further research is required to determine the impact of newer consulting modalities such as telephone and email consulting on recall.

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